

L I S T

of participants in the meeting in the  
USSR on scientific and technical coo-  
peration in "Cold Weather Construction  
Technique"

25 September - 9 October, 1974

I. The U.S. delegation included:

1. Fred R. Brown - U.S. Project Coordinator,  
Head of the U.S. delegation,  
Technical Director,  
Waterways Experiment Station, U.S. Army Corps  
of Engineers, Vicksburg, Miss.
2. Dean R. Freitag - Ph.D., P.E., Technical Director,  
Cold Regions Research and Engineering  
Laboratory (CRREL), U.S. Army Corps  
of Engineers, Hanover, N.H.
3. Homer B. Willis - Chief, Engineering Division, Civil Works  
Directorate Office, Chief of Engineers,  
U.S. Army Corps of Engineers, Washington, D.C.
4. Phillip L. Cole - Chief, Engineering Division, North Pacific  
Division, U.S. Army Corps of Engineers,  
Portland, OR.
5. William R. Groseclose - P.E., Chief, Division of Construction,  
Bureau of Reclamation, U.S. Department of the  
Interior, Denver Federal Centre,  
Denver, Colorado.

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Both sides discussed their problems in an atmosphere of mutual understanding and respect.

The present Protocol is signed in English and in Russian on the 8th of October, 1974 in Moscow in two copies. Both texts are authentic and equally authoritative.

For the U.S. Delegation  
on "Cold Weather Construction Techniques"

*Frederick R Brown*  
Frederick R. Brown  
U.S. Project Coordinator

For the U.S.S.R. Ministry  
of Power and Electrification

*Dmitri M. Yurinov*  
Dmitri M. Yurinov,  
Chief, All-Union  
Design, Survey and  
Research Institute  
"Hydroproject"

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| 3. | <p>The second meeting of experts.</p> <p>1) Become acquainted with the US experience in research, investigations, surveys, construction and maintenance of structures in cold regions;</p> <p>2) Working seminar with briefings on the problems:</p> <p>Principles of organization, planning and direction of hydroenergetic and other construction activities in various cold regions, including the organization of construction bases and living facilities.</p> | Ditto | Ditto | <p>First half of 1975, US CRREL, Hanover, N.H., and other places to be determined</p> | <p>Visits to scientific research centers, designing agencies, projects under construction and in operation.</p>  |
| 4. | <p>Participation in the International Symposium on Ice Engineering Problems, sponsored by IAHR.</p> <p>After the Symposium CRREL makes a provision for an additional workshop seminar for Soviet specialists in Ice Engineering. Ice problems in connection with the development and use of water resources will be discussed in more detail, including ice effects, design methods and norms.</p>  | Ditto | Ditto | <p>US, Hanover, New Hampshire, August, 1975</p>                                       | <p>An additional opportunity by the American side will be given for the participants of the workshop to get acquainted with the activities of the Cold Regions Laboratory. The representatives of the Ministry of Power and Electrification will be given an opportunity to visit the Waterways Experiment Station, Mississippi of the Corps of Engineers.</p> <p>Note: Each Party submits one general report for the Symposium.</p> |
| 5. | <p>Exchange of scientific and technical information, publications, reference materials, manuals, standards in force and other scientific and technical literature</p>   | Ditto | Ditto | <p>1974-</p>  | <p>Exchange on the basis</p>   |

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research, design, construction and maintenance of engineering structures in cold regions;

- to provide engineering services in the field of research and design. The conditions for accomplishing these services would be the subject of separate agreements;

- scientific and technical information exchanged may be freely used by the receiving country and exchanged with other countries unless the furnishing country specifies restriction on interchange with third countries. When so requested, the receiving country will make such arrangements as needed to assure that request of the furnishing country is followed.

Commercial, financial or legal problems which could arise from cooperative efforts should be the subject of special discussions and agreements.

It was concluded that exchanges of delegations or representatives free of currency exchange problems would contribute to the success of the envisioned cooperative effort. A plan in which the side receiving a delegation or representatives would bear all the costs of their stay in the receiving country would avoid such problems.

The arrangements set forth in this Protocol are subject to such in-country approvals as required to assure the participation of the agencies having technical capabilities in the areas involved.

Details of the program will be further defined during the return visit of the delegation or upon agreement of the coordinators from both sides or their designated representatives. The arrangement set forth in the Protocol can be cancelled if one of the sides informs the other side in a written form 6 months in advance of their wish to stop cooperative effort. The cancellation of the arrangements will not affect the validity of agreements or contracts which are underway. The arrangement can be continued beyond the five year period based upon rules established by the Joint U.S.-U.S.S.R. Working Group.

P R O T O C O L

Meeting of the U.S. delegation on "Cold Weather Construction Techniques" with Representatives of the Ministry of Power and Electrification of the U.S.S.R.

Moscow

October 8, 1974

In accordance with the U.S. - USSR agreement on cooperation in the field of science and technology signed in Moscow 24 May, 1972 and with the record of the first meeting of the Joint U.S. - USSR Work Group on Scientific and Technical Cooperation in Water Resources signed in September 30, 1972 the meeting of the US delegation made up of representatives from the Corps of Engineers, and the Bureau of Reclamation, U.S. and the Ministry of Power and Electrification, USSR, was held in Moscow at interval from September 24 to October, 8, 1974, to discuss the problems concerning scientific and technical cooperation on "Cold Weather Construction Techniques".

The U.S. delegation was headed by Mr. Frederick R. Brown, U.S. Project Coordinator and Technical Director of the U.S. Army Corps of Engineers, Waterways Experiment Station.

The USSR delegation was headed by Dr. L.I. Rudoyarov, Soviet Project Coordinator, Chief Engineer of the Planning and Research Department of the Ministry of Power and Electrification.

Delegates participating in the meeting are listed in Appendix I.

were

The following items discussed and agreed upon at the meetings:

I. The Program and Itinerary of the U.S. delegates in the USSR (Appendix 2).

2. Suggestions on the organization and details of scientific and technical cooperation on "Cold Weather Construction Techniques" (Appendix 3).

3. Current plans for scientific and technical cooperation for 1974-75 (Appendix 4).

Above referenced appendices are attached as part of this Protocol.

As a result of long and varied discussion both sides concluded that it would be desirable:

ORIGINAL WITH RECORDS

6. Andrew Assur - D.Sc., Chief Scientist, Cold Region Research and Engineering Laboratory (CRREL),  
U.S. Army Corps of Engineers, Hanover, N.H.

II. The USSR delegation included:

- I. L.I. Kudojarov - USSR Project Coordinator, Head of the USSR delegation, M.Tech.Sc., Chief of the Planning and Research Department (GLAVHII PROJEKT), USSR Ministry of Power and Electrification.
2. D.M. Jurinov - Chief, "Hydroproject" Institute, USSR Ministry of Power and Electrification.
3. I.L. Sapir - Chief Engineer, "Hydroproject" Institute, USSR Ministry of Power and Electrification.
4. A.G. Oskolkov - Chief, Scientific and Research Centre, "Hydroproject" Institute.
5. J.K. Sukhanov - Prof., Deputy Chief Engineer, "Hydroproject" Institute.
6. I.S. Moiseev - M.Tech.Sc., Deputy Chief Engineer, "Hydroproject" Institute.
7. A.G. Lykoshin - M.G.-M.Sc., Deputy Chief Engineer, "Hydroproject" Institute.
8. L.N. Toropov - Chief, Technical Department, "Glavvostok - gidroenergostroi", USSR Ministry of Power and Electrification.
9. V.Y. Sherskov - Expert, "Hydroproject" Institute.
10. V.G. Samarin - M.Tech.Sc., Senior Scientist, Scientific and Research Centre, "Hydroproject" Institute.
- II. R.V. Krasovitski - M.Tech.Sc., Deputy Director of All-Union Research Institute of Hydraulics (VNIIG).

I2. A.N.Zhebrovski - Chief, Technical Department, VNIIG.

I3. V.V.Goncharov - M.Tech.Sc., Scientific Secretary,  
VNIIG.

I4. L.K.Pomanski - Chief Engineer, Leningrad Section,  
"Hydroproject" Institute.

I5. A.F.Vasiljev - Deputy Chief Engineer, Leningrad  
Section, "Hydroproject" Institute.

PROGRAM AND ITINERARY  
of the US delegation on "Cold Weather  
Construction Techniques" in the USSR

September 24 -- Arrival in the USSR (the Sheremetievo Airport,  
Moscow).

September 25 - Visit to the USSR Ministry of Power and Elec-  
trification; meeting with L.I. Koudoyarov, the  
USSR Project Coordinator. Visit to the "Hydro-  
project" Institute. Discussion of the program  
and itinerary. General information about the  
"Hydroproject" Institute activity.  
Information about the activity of the U.S. Army  
Corps of Engineers and Bureau of Reclamation.  
Discussion of problems of hydraulic engineering  
in cold weather conditions and problems of co-  
operation in the fields of research, investi-  
gations, surveys, design, construction and  
maintenance of Hydrostructures. Discussion of  
possible forms of scientific and technical co-  
operation.  
Evening program.

September 26 - Visit to the "Hydroproject" Institute Scienti-  
fic Research Centre. General information about  
main directions and aims of the Centre activi-  
ty. Inspection of leading laboratories. Discus-  
sion of the possible themes of scientific and  
technical cooperation. Departure for Leningrad.

September 27 - Arrival at Leningrad. Visit to the All-Union  
Institute of Hydraulic Engineering (under the  
Ministry of Power and Electrification of the  
USSR). General information about the tasks of  
the Institute. Discussion of the possible the-  
mes of the scientific and technical cooperation.



Inspection of leading laboratories.  
Evening program.

September 28 -- Sightseeing tour in Leningrad.  
Departure for Moscow.

September 29 -- Arrival at Moscow. Visit to the Moscow Kremlin.  
Departure for Irkutsk.

September 30 -- Arrival at Irkutsk. Flight to Mirnyi. Departure for Chernyshevskii.

October 1 -- Visit to the Vilui hydroelectric stations. Discussion of problems related to cold weather construction.

October 2 -- Left Mirnyi for Irkutsk. Then to Bratsk.

October 3 -- Flight to Ust-Ilimsk and visit to the Ust-Ilim Hydroelectric Project Site.  
Return to Bratsk.

October 4 -- Visit to the Bratsk Hydroelectric Station.

October 5 -- Flight to Irkutsk. Bus journey to the Baikal Lake. Return to Irkutsk.

October 6 -- Visit to the Irkutsk Hydroelectric Station.  
Flight to Moscow (the Domodedovo Airport).

October 7 -- Visit to the "Hydroproject" Institute. Discussion of results of inspection of the Soviet hydropower projects and of plans of scientific and technical cooperation. Discussion on the Draft Protocol on cooperation for the "Cold Weather Construction Techniques" Project.  
Evening program.

October 8 -- Visit to the "Hydroproject" Institute. Concluding meeting; signing the joint documents.

October 9 -- Departure from the USSR (the Sheremeticovo Airport, Moscow).

O R G A N I Z A T I O N  
of the USSR - U.S. scientific and tech-  
nical cooperation on "Cold Weather  
Construction Techniques"

The bilateral scientific and technical cooperation on "Cold Weather Construction Techniques" includes a wide scope of problems in research, investigations, surveys, designing, construction and maintenance of hydraulic power and other hydraulic structures in cold regions, and provides for exchange of experiences in this field.

Cooperative efforts shall be closely outlined and the work conducted on a mutually advantageous basis.

I. Organization of Cooperation

Guidance of cooperation will be as given by the corresponding Joint U.S.-USSR Working Group for scientific and technical cooperation. Coordination will be implemented by a group of experts on the topic "Cold Weather Construction Techniques" to which each side appoints its specialists. The short-term (1 to 2 years) cooperation will be carried out according to current plans, where topics, responsible agencies, terms, forms of cooperation and needed measures are shown.

II. Forms of Cooperation

The forms of scientific and technical cooperation are as follows:

I. Mutual exchange of scientific and technical information on problems of interest to both sides, including publications, reference books, manuals, standards in force etc., as well as results of investigation and development work carried out in accordance with joint current plans.

2. Sponsorship of Joint Seminars and Symposiums on problems of mutual interest.

3. Exchange of delegations of specialists for consultations and for exchange of experience of "Cold Weather Construction Techniques", in particular for research and investigations, design and exploitation of hydrotechnical, hydroenergetic and other structures connected with the development and use of water resources.

### III. Themes of Cooperation

The main trends in the scientific and technical cooperation are aimed at the following topics of mutual interest:

1. Principles followed in establishing the infra-structure in sparsely populated cold regions and the associated problems of organization, planning and management of construction work.

2. Methods used in concrete construction and in open and underground earth-and-rock <sup>excavation</sup> ~~construction~~ under conditions of low temperatures. Choice of construction and transporting equipment, requirements for building materials (concrete, soil materials, stone, polymeric materials, ice etc.) used in structures in cold regions.

3. Scope and techniques used in the investigations of physical and geotechnical properties of soils and rocks in the foundations of structures, including permafrost soils; methods of a seismological evaluation of areas of construction.

4. Modern methods of analysis for theoretical and experimental investigation of the stressed (and thermal stressed) state of dams. Crack formation and stability of concrete dams and embankment dams in cold regions.

5. Types and rational designs of structures (dams, powerhouses, ship locks etc.) and methods of construction in cold regions, including pumped storage plants, water outlets and water control

rol structures. This includes cold region requirements for mechanical, hydropower and electrical equipment.

6. Experience of maintenance of large hydroelectric projects in cold regions, including measures taken for safety and reliability of structures.

7. Control observation of structural behaviour including instrumenting of structures and their foundations, analysis and generalization of full scale field observations.

8. Hydraulic, filtration and ice-engineering investigations of structures, foundations, adjoining water-bodies and freezing waterways.

9. Problems of protection and conservation of environment in areas of construction and water resources development in cold regions.

#### IV. List of Cooperative Agencies

##### From the U.S. side:

I. Corps of Engineers, U.S. Army, including

a) Cold Regions Research and Engineering Laboratory,  
Hanover, New Hampshire

b) Waterways Experiment Station, Wicksburg, Mississippi

c) North Pacific Division, Portland, Oregon

2. Bureau of Reclamation, Department of Interior, Denver, Colorado.

3. Other organizations, as required.

From the USSR side:

1. USSR Ministry of Power and Electrification
2. All-Union Design, Survey and Scientific Research Institute "Hydroproject", Moscow (USSR Ministry of Power and Electrification)
3. The Scientific Research Centre of "Hydroproject" Institute, Moscow
4. The All-Union Institute of Hydraulic Engineering, Leningrad
5. Other agencies (as required).

Note:

The American side suggested the addition of , in particular the Permafrost Institute of the Academy of Sciences of the USSR (Siberia Department), R & E Institute of Foundations and underground Construction of the Gosatom USSR and the Moscow Civil Engineering Institute of the Ministry of Higher Education.

## Current Plan

for scientific and technical US-USSR cooperation in 1974-75  
on "Cold Weather Construction Techniques"

| Nos | Planned work   | Responsible agencies   |   | Dates and meeting places                  | Forms of cooperation and organizational questions   |
|-----|--|--|---|---|---|
|     |  | in USSR  | in US   |   |   |
| I   | 2  | 3  | 4   | 5   | 6   |
| I   | First meeting of representatives of the USSR Ministry of Power and Electrification and of US Army Corps of Engineers and Bureau of Reclamation on: | USSR Ministry of Power and Electrification, All-Union Institute of "Hydroproject", Scientific Research Centre of "Hydroproject" Institute (Moscow); All-Union Institute of Hydraulic Engineering (Leningrad) | US Army Corps of Engineers: Cold Regions Research and Engineering Laboratory, Watery, Ways Experiment Station and North Pacific Division; Bureau of Reclamation | USSR, Moscow September 24-October 9, 1974 | 1) Preparation of the Joint Protocol on scientific and technical cooperation;<br>2) Preparation of suggestions on organization, forms and themes of cooperation;<br>3) Preparation and adoption of the current plan of cooperation for 1974-75;<br>4) Visit of US delegation to scientific research centers of the USSR Ministry of Power and Electrification in Moscow and Leningrad and to hydropower projects under construction in Siberia (special program). |
| a)  | Examination of joint suggestions for scientific and technical cooperation;   |  |   |   |   |
| b)  | Adoption of the joint plan of scientific and technical cooperation for 1974-75;  |  |   |   |   |
| c)  | Information about the USSR experience in research and construction of hydraulic structures in cold regions   |  |   |   |   |
| 2.  | Exchange of lists information documents on this theme  | Ditto  | Ditto   | Till the end of 1974                      | Exchange of lists   |

| No. | Category of work  | Activities in carrying out work by stages  | Sponsors                           |                              | Duration of work           | Expected results   |
|-----|---|--|------------------------------------|------------------------------|----------------------------|--|
|     |   |  | USSR                               | USA*                         |                            |  |
| b.  | Investigation of polymer concrete (concrete with polymer as the cementing agent). | <p>1. Exchanging scientific technical information and documentation on application of polymer-concrete, resins for polymer-concrete, and exchange of samples of materials.</p> <p>2. Conducting laboratory and field investigations of various polymer-concretes, developed for protection of hydro-structures against wear and cavitation, and repair compositions. Investigate bond of various polymer-concretes to portland-cement concrete.</p> <p>3. Preparation of a manual on selection of resins and execution of repairs with use of polymer compositions.</p> <p>4. Conducting laboratory investigations of polymer-concretes with various resins and working out designs of prefabricated polymer-concrete lining of structures and other special uses requiring strengths and durability. Investigate applications of polymer-concrete to new construction by testing various formulations for strength, creep, durability, chemical stability, erosion resistance and cavitation resistance in normal environments and environments of high temperature or high salinity.</p> | VNIIVod-polymer. Ukrainian NIIG-M. | U.S. Army Corps of Engineers | I, 1975                    | <p>Recommendations on the use of polymeric compositions in repairing hydraulic structures. Recommendations on the use of resins in repair of concrete elements of hydraulic structures.</p> <p>Recommendation on the use of polymer concretes with various resins for protections of hydro-structures against wear, cavitation, and severe environments.</p> |
|     |   |  |                                    |                              | IV, 1975                   |  |
|     |   |  |                                    |                              | III, 1976 through IV, 1978 |  |



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| <u>Category of work</u>   | <u>Sponsors</u> |             | <u>Duration of work</u> | <u>Expected results</u> |
|---|-----------------|-------------|-------------------------|-------------------------|
|   | <u>USSR</u>     | <u>USA*</u> |                         |                         |
| <u>Activities in carrying out work by stages</u>  |                 |             |                         |                         |
| 5. Develop field techniques for both monolithic and precast constructions including applications to resist abrasion and cavitation. |                 |             | IV, 1978                |                         |
| 6. Completing categories No. 4 (a) and (b) discuss results, prepare recommendations and report.                                     |                 |             | II, 1979                |                         |

GPO 657-212